In the Claims:

Please cancel claims 1-5, 7-8, 11-16, 18-19, and 28-31. The status of all claims is as follows:

1-5. (Cancelled)

6. (Previously Presented) An active noise control apparatus for reducing noise from a noise source, comprising:

a first detector for detecting noise produced by the noise source;

a generalized finite impulse response (FIR) filter for receiving noise signals of the detected noise from said first detector, and generating control signals for reducing the noise from the noise source; and

a sound generator for producing sound based on said control signals from said generalized FIR filter for substantially canceling the noise from the noise source;

wherein said generalized FIR filter is described by

$$F(q,\theta)=\theta_0+\sum_{k=1}^{N}\theta_k f_k(q), \theta=[\theta_0,\theta_1,\ldots,\theta_N]$$

where $f_k(q)$ are generalized (orthonormal) basis functions including information on a desired dynamic behavior of said generalized FIR filter, θ_0 is the direct feedthrough term of said generalized FIR filter and θ_k are optimal filter coefficients of said generalized FIR filter;

wherein said generalized FIR filter is constructed by initializing said basis function $f_k(q)$, and recursively estimating said θ_k based on said initialized basis function $f_k(q)$; and

the apparatus as defined in claim 5, wherein said basis function $f_k(q)$ are initialized by a predetermined dynamical model that includes initial approximate information dynamics of said generalized FIR filter.

7-8. (Cancelled)

9. (Previously Presented) An active noise control apparatus for reducing noise from a noise source, comprising:

a first detector for detecting noise produced by the noise source;

a generalized finite impulse response (FIR) filter for receiving noise signals of the detected noise from said first detector, and generating control signals for reducing the noise from the noise source;

a sound generator for producing sound based on said control signals from said generalized FIR filter for substantially canceling the noise from the noise source; and

a second detector for detecting noise downstream of said sound generator;

wherein a signal of the noise detected by the second detector is described by

$$e(t) = W(q)\left[H(q) + \frac{G(q)F(q)}{1 - G_c(q)F(q)} \right] n(t)$$

where, $W(q)$ is a stable and stable invertible noise filter for a white noise signal $n(t)$; $H(q)$ characterizes a dynamic relationship between the input signal $u(t)$ from said first

detector and said signal *e(t)* detected by said second detector; *G(q)* characterizes the relationship between said control signal from said generalized FIR filter $F(q)$ and said signal *e(t)* detected by said second detector; and $G_c(q)$ indicates an acoustic coupling from said sound generator signal back to said signal *u(t)* from said first detector that creates a positive feedback loop with said generalized FIR filter *F(q)*.

10. (Original) The apparatus as defined in claim 9, wherein said first detector is located based on conditions at the second detector which satisfy

$$e_1(t) = H(q)u(t) \quad \text{and}$$

$$e_2(t) = -G(q)\tilde{u}(t) = -G(q)u(t) - G(q)v(t)$$

where *v(t)* indicates a disturbance detected by said first detector.

11-16. (Cancelled)

17. (Previously Presented) A method for reducing noise from a noise source in an active noise control system, comprising:

detecting first noise produced by the noise source;

generating control signals from a generalized finite impulse response (FIR) filter for reducing the first noise from the noise source based on a first signal of said detected noise; and

producing sound based on said control signals for substantially canceling said first noise from the noise source;

wherein said generalized FIR filter is described by

$$F(q,\theta)=\theta_0+\sum_{k=1}^{N}\theta_k f_k(q), \theta=[\theta_0,\theta_1,...,\theta_N]$$

where $f_k(q)$ are generalized (orthonormal) basis functions containing information on a desired dynamic behavior of said generalized FIR filter, θ_0 is a direct feedthrough term of said generalized FIR filter and θ_k are optimal filter coefficients of said generalized FIR filter;

wherein said generalized FIR filter is constructed by initializing said basis function $f_k(q)$, and recursively estimating said θ_k based on said initialized basis function $f_k(q)$; and

wherein said basis function $f_k(q)$ is initialized by a predetermined dynamical model that includes initial approximate information dynamics of said generalized FIR filter.

18-19. (Cancelled)

20. (Previously Presented) A method for reducing noise from a noise source in an active noise control system, comprising:

detecting first noise produced by the noise source;

generating control signals from a generalized finite impulse response (FIR) filter for reducing the first noise from the noise source based on a first signal of said detected noise;

producing sound based on said control signals for substantially canceling said first noise from the noise source; and

detecting second noise after said sound based on said control signals has been produced by a second detector;

wherein a second signal of the second noise detected after said sound based on said control signals has been produced by the second detector is described by

$$e(t) = W(q)\left[H(q) + \frac{G(q)F(q)}{1 - G_c(q)F(q)}\right]n(t)$$

where, $W(q)$ is a stable and stable invertible noise filter for a white noise signal $n(t)$; $H(q)$ characterizes a dynamic relationship between the first signal $u(t)$ and said second signal $e(t)$; $G(q)$ characterizes the relationship between said control signal from said generalized FIR filter $F(q)$ and said first signal $e(t)$; and $G_c(q)$ indicates an acoustic coupling from said sound generator signal back to said first signal $u(t)$ that creates a positive feedback loop with said generalized FIR filter $F(q)$.

21. (Original) The method as defined in claim 20, wherein said first noise is detected at a location based on conditions which satisfy

$$e_1(t) = H(q)u(t) \text{ and}$$

$$e_2(t) = -G(q)\tilde{u}(t) = -G(q)u(t) - G(q)v(t)$$

where $v(t)$ indicates a third noise detected along with said first noise.

22. (Original) An active noise control apparatus for reducing periodic noise from a noise source, comprising:

a detector for detecting noise produced by the noise source;

a controller for generating control signals for compensating the periodic noise detected in the noise; and

a sound generator for producing sound based on said control signals from said controller for substantially canceling the periodic noise from the noise source;

wherein said control signal is generated based on an equation,

$$K(q) = \arg\min_K \left\| \begin{matrix} \dfrac{\alpha W_i(q)K(q)H_n(q)}{1-G(q)W_i(q)K(q)} \\ \dfrac{W_i(q)H_n(q)}{1-G(q)W_i(q)K(q)} \end{matrix} \right\|_2$$

where, $W_i(q)$ is a discrete time internal dynamical model for reducing periodic disturbances, $H_n(q)$ is a discrete time filter used to model the spectrum of the non-periodic noise disturbances, $G(q)$ is a discrete time filter that models the dynamics between sound generator and said detector and α is a scalar real-valued constant.

23. (Original) The apparatus as defined in claim 22, wherein said controller comprises a feedback controller.

24. (Original) The apparatus as defined in claim 22, wherein said detector is a microphone and said sound generator is a speaker, said microphone and said speaker being positioned proximate and downstream of the noise source.

25. (Original) A method for reducing periodic noise from a noise source, comprising:

detecting noise produced by the noise source;

generating control signals from a controller for compensating the periodic noise detected in the noise; and

producing sound based on said control signals from said controller for substantially canceling the periodic noise from the noise source;

wherein said control signal is generated based on an equation,

$$K(q) = \arg\min_{K} \left\| \begin{matrix} \dfrac{\alpha W_i(q)K(q)H_n(q)}{1-G(q)W_i(q)K(q)} \\ \dfrac{W_i(q)H_n(q)}{1-G(q)W_i(q)K(q)} \end{matrix} \right\|_2$$

where, $W_i(q)$ is a discrete time internal dynamical model for reducing periodic disturbances, $H_n(q)$ is a discrete time filter used to model a spectrum of the non-periodic noise disturbances, $G(q)$ is a discrete time filter that models the dynamics between a sound generator for producing said sound based on said control signals and a detector for detecting the noise produced by the noise source, and α is a scalar real-valued constant.

26. (Original) The method as defined in claim 25, wherein said controller comprises a feedback controller.

27. (Original) The method as defined in claim 25, wherein the noise is detected by a microphone and said sound based on said control signals from said controller is produced by a speaker, said microphone and said speaker being positioned proximate and downstream of the noise source.

28-31. (Cancelled)